

PROCEEDINGS  
OF THE  
BIOLOGICAL SOCIETY OF WASHINGTON

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DESCRIPTIONS OF ELEVEN NEW MALAYAN  
MOUSE DEER.

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[By permission of the Secretary of the Smithsonian Institution.]

The United States National Museum contains about two hundred Malayan mouse deer, most of which have been collected and presented by Dr. W. L. Abbott.\* Two specimens of un-

\*See the following papers by the author of the present article:

Mammals collected by Dr. W. L. Abbott on Islands in the South China Sea. <Proc. Washington Acad. Sci., II, pp. 203-246. August 20, 1900 (*T. rufulus*, p. 227).

A new Mouse Deer from Lower Siam. <Proc. Biol. Soc. Washington, XIII, pp. 185-186, December 21, 1900 (*T. canescens*, p. 185).

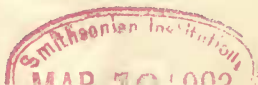
Mammals collected by Dr. W. L. Abbott on Pulo Lankawi and the Butang Islands. <Proc. Biol. Soc. Washington, XIII, pp. 187-193. December 21, 1900 (*T. umbrinus*, p. 191).

Mammals collected by Dr. W. L. Abbott on the Natuna Islands. <Proc. Washington Acad. Sci., III, pp. 111-138. March 26, 1901 (*T. bunguranensis*, p. 113, *T. pallidus*, p. 116).

Mammals collected by Dr. W. L. Abbott in the region of the Indragiri River, Sumatra. <Proc. Acad. Nat. Sci. Philadelphia, 1902, pp. 143-159. June 11, 1902 (*T. pretiosus*, p. 144, *T. nigricollis*, p. 145).

Two new Malayan Mouse Deer. <Proc. Biol. Soc. Washington, XV, pp. 173-175. August 6, 1902 (*T. rarus*, p. 173, *T. borneanus*, p. 174).

Mammals collected by Dr. W. L. Abbott on the coast and islands of Northwest Sumatra. <Proc. U.S. National Museum, XXVI, pp. 437-484. February 3, 1903 (*T. amoenus*, p. 439, *T. jugularis*, p. 440, *T. brevipes*, p. 443, *T. russeus*, p. 444).



usual interest have, however, been recently obtained through the kindness of Mr. B. S. Rairden, United States Consul at Batavia, Java. Study of this material as it was received has already led to the discovery of thirteen new forms. To this number eleven are now added, none of which appears to have hitherto been described and named.

**Tragulus lutescens, sp. nov.**

*Type*.—Adult male (skin and skull) No. 115,507 United States National Museum. Collected on Pulo Sugi Bawa, Rhio Archipelago, September 2, 1902, by Dr. W. L. Abbott. Original number 2011.

*Characters*.—A member of the *napu* group somewhat resembling *Tragulus canescens* of the Malay Peninsula, but not as large, and color much more yellowish; dark nape stripe present but not sharply defined; dark throat stripes heavily shaded with black.

*Color*.—Type: Back orange-buff, heavily clouded with blackish brown, but latter color not in excess of former. On sides the orange-buff fades rather abruptly through straw yellow to cream color, the black clouding at the same time becoming less noticeable and producing a finer grizzle, but this region is not distinctly contrasted with the back. Coarse fur of shoulders, neck, and nape orange-buff, of a tint somewhat lighter and duller than that of backs, and everywhere mixed with blackish hairs. Along median line these are so much in excess as to produce a broad dark stripe slightly speckled with yellowish and fading without sharp line of demarkation into color of sides of neck. Elsewhere the black produces a mere inconspicuous grizzle in the orange-buff. The dark nape stripe is continued forward between ears and eyes nearly to muzzle. Pale superciliary stripe well defined, concolor with cheeks and sides of neck. Over middle of eye it is about 10 mm. in width. Throat pattern normal, *the two dark stripes with only a little more yellow than in nape band*. Collar narrow but distinct, concolor with sides of body, therefore noticeably lighter than longitudinal dark bands. A clear orange-buff line extends forward from side of neck at level of front of dark throat stripes nearly to naked chin area where it meets its fellow of the opposite side. In a second specimen this line is rather wider than the white throat stripes and the two unite to form a broad patch extending back 30 mm. from naked chin area. Chest, belly, and inner surface of legs white, the chest with a narrow brownish median line, the belly faintly washed with yellow. In a second specimen this wash is much more extensive and many of the hairs producing it are tipped with blackish, causing a distinct clouding. Outer surface of legs like sides but slightly more yellow, the hind legs brightening to ochraceous above heel. Tail white beneath and at tip, dull orange-buff above, very slightly grizzled by a few blackish hair tips.

*Skull and teeth.*—The skull and teeth, except for their markedly smaller size, do not differ appreciably from those of *Tragulus canescens* and *T. napu*.

*Measurements.*—External measurements of type: total length, 563; head and body, 488; tail vertebrae, 75; hind foot, 131 (117); ear from meatus, 33; ear from crown, 28. Measurements of an adult female from the type locality: total length, 600; head and body, 510; tail vertebrae, 90; hind foot, 131 (117); ear from meatus, 34; ear from crown, 30.

Cranial measurements of type: greatest length, 105 (110)\*; basal length, 96.4 (105); basilar length, 90 (99); occipito-nasal length, 96 (99); length of nasals, 32 (29); greatest breadth of both nasals together, 10 (12); diastema, 9 (9.6); zygomatic breadth, 44 (49); least interorbital breadth, 26 (30); mandible, 82 (89); maxillary toothrow (alveoli), 34.6 (40); maxillary premolars (crowns), 17.4 (20); mandibular toothrow (alveoli), 39 (46); mandibular premolars (crowns), 18 (22).

*Weight.*—Type, 2.5 kg.; adult female from type locality, 3 kg.

*Specimens examined.*—Two, both from Pulo Sugi Bawa.

*Remarks.*—This *napu* is so readily distinguished from all previously known species by its small size, normal throat pattern and strongly yellowish color that it needs no special comparison with any. The two specimens are closely similar to each other except that the female is, as usual, the larger. Some trifling variations in color have already been noted.

### ***Tragulus flavicollis*, sp. nov.**

*Type.*—Immature† female (skin and skull) No. 115,505 United States National Museum. Collected on Pulo Sugi, Rhio Archipelago, August 24, 1902, by Dr. W. L. Abbott. Original number 1957.

*Characters.*—Much like *Tragulus lutescens* but yellower; nape stripe absent, and dark throat stripes very slightly shaded with black.

*Color.*—The general color is essentially as in *Tragulus lutescens*, but the tawny element is everywhere more distinctly yellow, this most noticeable on cheeks and neck. On nape the sprinkling of blackish hairs is as inconspicuous as at sides of neck, so that there is no trace of a dark median stripe. Throat pattern normal, the dark bands very slightly more sprinkled with black than sides of neck. Collar very narrow. The anterior yellowish bands are only about 15 mm. in length, leaving the entire throat from chin to main throat stripes pure white. Underparts as in the female specimen of *Tragulus lutescens*, but with less blackish clouding.

*Skull and teeth.*—I can detect nothing to distinguish the skull and teeth from those of *Tragulus lutescens*.

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\*Measurements in parenthesis are those of an adult male *Tragulus canescens* from the Endau River, Johore. (No. 112,583.)

†Uterus contained a small embryo. Milk premolars still in place, though much worn.

*Measurements.*—External measurements of type: total length, 600; head and body, 520; tail vertebrae, 80; hind foot, 132 (117); ear from meatus, 37; ear from crown, 34. Skull: greatest length, 105; basal length, 98; zygomatic breadth, 44.

*Weight.*—3 kg.

*Specimens examined.*—One, the type.

*Remarks.*—In the character of its neck and throat markings *Tragulus flavicollis* agrees with the small, bright *T. rufulus* of Tioman Island and represents the opposite extreme from *Tragulus annæ*, in which the entire region is clear black. It only remains to discover species with the white of the throat obliterated by the encroachment of fulvous on the white bars to complete the possible variations of this pattern.

### ***Tragulus formosus*, sp. nov.**

*Type.*—Adult male (skin and skull) No. 115,511 United States National Museum. Collected on Pulo Bintang, Rhio Archipelago, August 19, 1902, by Dr. W. L. Abbott. Original number 1907.

*Characters.*—A member of the *napu* group similar in general appearance to *Tragulus pretiosus* of Linga Island, but with dark nape stripe less defined, fulvous of neck and throat more red, and underparts usually more washed with yellowish. Premolars larger than in *T. pretiosus*.

*Color.*—Type: Upperparts bright orange-ochraceous darkening to ochraceous-rufous on neck and outer surface of legs and lightening to orange-buff on sides of body, the hairs everywhere drab at base and black at tip. The black tips are most conspicuous over middle of back, where they produce a heavy dark shading a little in excess of the orange-ochraceous. On sides of body they are slightly less noticeable, and on sides of neck and head and outer surface of legs would readily escape observation. Crown and median line of neck black, both heavily sprinkled with ochraceous-rufous, the nape stripe so much so as to form no striking contrast with surrounding parts. Superciliary stripe distinct, about 7 mm. wide above eye, concolor with cheeks and sides of neck. Muzzle and ears blackish. Throat markings normal, the hairs of the dark bands blackish at base and heavily annulated with bright ochraceous-rufous. Collar narrow but distinct, its color intermediate between that of neck and sides of body. Underparts much like sides, but with a drab cast, except a pure white area on chest and another on hypogastric region, the former partly divided by a narrow brownish median line. The posterior white area is continued down inner side of hind legs, but that on chest is separated from white of inner surface of front legs by a narrow yellowish drab line. Tail ochraceous-rufous above, pure white below and at tip.

*Skull and teeth.*—I cannot see that the skull differs from that of *Tragulus pretiosus*. The permanent premolars both above and below, are, however, distinctly larger than in the related animal.

*Measurements.*—External measurements of type: total length, 600;



head and body, 530; tail vertebrae, 70; hind foot, 137 (124); ear from meatus, 39; ear from crown, 36. Average of four adult males from the type locality: total length, 613 (600-631); head and body, 536 (530-546); tail vertebrae, 77 (70-85); hind foot, 140 (137-142); hind foot without hoofs, 125.5 (124-127). Average of three adult females from the type locality: total length, 654 (620-693); head and body, 566 (535-593); tail vertebrae, 88 (80-100); hind foot, 141 (137-144); hind foot without hoofs, 126 (122-129).

Cranial measurements of type: greatest length, 106 (108)\*; basal length, 99 (101); basilar length, 94 (95); occipito-nasal length, 97 (99); length of nasals, 33 (33.6); greatest breadth of both nasals together, 10.6 (11.6); diastema, 10 (11); zygomatic breadth, 47 (49); least interorbital breadth, 27 (29); mandible, 86.4 (88); maxillary toothrow (alveoli), 37 (36); maxillary premolars (crowns), 19 (18); mandibular toothrow (alveoli), 42 (42); mandibular premolars (crowns), 19 (18.4).

Weight.—Type, 3 kg. Average of four adult males, 3.5 (3-3.7). Average of three adult females, 4 (3-4.3).

*Specimens examined*.—Nine, all from Pulo Bintang.

*Remarks*.—Though rather closely related to *Tragulus pretiosus* the napu of Bintang is readily distinguishable from that of Linga by its more intense color, particularly of the throat markings and neck, and by the larger premolars.

### *Tragulus focalinus*, sp. nov.

1777. "*Animalculus ex Java acceptus*" Pallas, *Spicilegia Zoologica*, fasc. XII, p. 18, footnote under *Antilopepygmaea*. No name.

1788. *Moschus javanicus* Gmelin, *Syst. Nat.*, XIII ed., I, p. 174. Based on Pallas. Not *Cervus javanicus* Osbeck, 1765, or *Tragulus javanicus* of most recent authors.

1858. *Tragulus pelandoc* Blyth, *Journ. Asiat. Soc. Bengal*, XXVII, p. 277. Not *Moschus pelandoc* H. Smith, 1827.

1864. *Tragulus javanicus* A. Milne Edwards, *Annales des Sciences Naturelles*, 5e sér., Zoologie, II, p. 157. Not *Cervus javanicus* Osbeck.

1902. *Tragulus pelandoc* Stone and Rehn, *Proc. Acad. Nat. Sci. Philadelphia*, pp. 131, 132, June 4, 1902. Not *Moschus pelandoc* H. Smith, 1827.

*Type*.—Adult female (skin and skull) No. 120,574 United States National Museum. Collected near Buitenzorg, Java, in October or November, 1902. Received from B. S. Rairden, U. S. Consul at Batavia.†

*Characters*.—A member of the *kanchil* group distinguished from all

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\*Measurements in parenthesis are those of the type of *Tragulus pretiosus*.

† Under date of November 17, 1902, Mr. Rairden writes: "I have had considerable difficulty in obtaining these animals, and am indebted to Dr. van Romburgh of the Botanic Gardens at Buitenzorg for assistance."

others now known by the great width and distinctness of the tawny superciliary stripes, and by the grizzled gray neck strikingly contrasted with tawny body and head; no dark nape stripe; throat markings normal.

*Color*.—Type: Back raw-sienna, fading laterally through buff to the cream-buff of sides, the hairs everywhere ecru-drab at base and blackish at tip. The black tips produce a faint dark median area along back, but at sides the buff and cream-buff predominate. The grizzle produced by the dark and light colors is everywhere very fine and inconspicuous. Entire neck coarsely grizzled gray, the individual hairs black, each with a buffy white band 2-4 mm. in width at tip or just below. The gray area begins immediately behind cheeks and ears and continues to front of shoulder. At each end it passes abruptly into color of neighboring region. Anteriorly it shows a tendency to darken in the median line, but not enough to produce a dark nape band. Crown blackish, the hairs with dull inconspicuous tawny annulations. Cheeks and superciliary stripe dull orange-buff, a little speckled by dark hair tips, *the superciliary stripe nearly as wide as the median dark area*. Throat markings normal, the transverse bands united in front, and nearly concolor with neck, though slightly buff tinged. Collar like sides of body, but more strongly grizzled. Underparts and inner surface of legs pure white. Outer surface of legs raw-sienna, much brighter and more tinged with red on thighs. Tail raw-sienna above, pure white below and at tip. A second specimen from the type locality (immature male, No. 120,573) is in all respects similar except that the light annulations on neck are almost pure white, and the median line of chest and belly is washed with orange buff from just behind axillæ to level of thighs.

*Skull and teeth*.—The skull closely resembles that of *Tragulus kanchil* except that the rostrum is shorter and the audital bullæ (in the two skulls examined) are narrower. Teeth as in *Tragulus kanchil*.

*Measurements*.—External measurements of type (from well made skin): total length, 410; head and body, 360; tail vertebræ, 50; hind foot, 105 (95); ear from meatus, 33; ear from crown, 26. Measurements of an immature male from the type locality (from well made skin): total length, 410; head and body, 365; tail vertebræ, 45; hind foot, 110 (100); ear from meatus, 30; ear from crown, 25.

Cranial measurements of type: greatest length, 88 (90)\*; basal length, 81 (82); basilar length, 77 (76); occipito-nasal length, 82 (82); length of nasals, 21 (21.6); greatest breadth of both nasals together, 12 (12); diastema, 10 (8.8); zygomatic breadth, 41 (39); least interorbital breadth, 26 (26); mandible, 65 (69); maxillary toothrow (alveoli), 32.4 (30.2); maxillary premolars (crowns), 16.2 (16.8\*); mandibular toothrow (alveoli), 36 (35); mandibular premolars (crowns), 16 (17†).

*Specimens examined*.—Two, both from the type locality.

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\* Measurements in parenthesis are those of the immature male already referred to.

† Milk teeth.

*Remarks.*—The gray neck and broad, yellowish superciliary stripe immediately distinguish *Tragulus focalinus* from all other known members of the genus.

Through the kindness of Mr. Witmer Stone of the Academy of Natural Sciences of Philadelphia, I have before me the Javan specimen recorded by Stone and Rehn as *Tragulus pelandoc*. It is an adult male (permanent dentition in place, but unworn) with colors somewhat faded from long exposure to light. In color pattern it exactly agrees with the male of *Tragulus focalinus*, except that the transverse throat stripes do not meet in front, a character which is doubtless individual. In size, however, it so much exceeds either of the specimens of *T. focalinus* (hind foot, 116; greatest length of skull, 95) as to suggest that it represents a distinct form.

The specific name *pelandoc* has been twice applied to a gray-necked *Tragulus*, by Blyth in 1858, and by Stone and Rehn in 1902. It was originally based, however, on the "Pelandok" of Raffles (Trans. Linn. Soc. London, XIII, p. 263, 1822) an animal which cannot be positively identified, but which is, so far as Raffles' account\* and our present knowledge are concerned, not different from the *Tragulus kanchil* of Sumatra.

### *Tragulus virgicollis*, sp. nov.

*Type.*—Adult male (skin and skull) No. 83,941, United States National Museum. Collected at altitude of 3000 feet on Mt. Dulit, Sarawak, Borneo, in June, 1895, by Ernest Hose and Charles Hose.

*Characters.*—Largest known member of the *kanchil* group (hind foot about 130). General color lighter and more yellow than in *Tragulus kanchil*; nape stripe clear black, narrow, and very sharply defined.

*Color.*—Type: General color above buff-yellow, heavily clouded with black on back, slightly on sides, where the ground color becomes paler. Cheeks and neck clear orange-buff, the former somewhat bleached and grizzled. Nape stripe clear black, sharply defined, only about 12 mm. in width. Crown brownish, faintly grizzled with yellowish. Superciliary stripe narrow and obsolete, though faintly visible in certain lights. Throat pattern normal, the oblique stripes united in front. Both collar and oblique stripes are essentially concolor with sides of neck, though the latter are rather heavily clouded with dark brown. Underparts and inner surface of legs white. Median line with a dull buff-yellow stripe, narrow and tinged with brownish anteriorly, about 35 mm. wide at middle of belly. Tail dull yellowish brown above, pure white below and at tip.

*Skull and teeth.*—The skull is similar to that of *Tragulus kanchil* ex-

\* "The Pelandok is the least of the three [the others are the napu and the kanchil] in point of height, but has proportionably a larger and heavier body: it has also a larger eye." The context indicates that this statement rests on the authority of native accounts of the species.

cept that it is larger and the rostral portion is more elongate. Teeth essentially as in the Sumatran animal, though the premolars appear to be less robust.

*Measurements.*—External measurements of type (from well made skin): total length, 560; head and body, 470; tail vertebrae, 90; hind foot, 31.4 (19); ear from meatus, 35.6; ear from crown, 29.

Cranial measurements of type: greatest length, 98 (92)\*; basal length, 90 (86); basilar length, 86 (79); occipito-nasal length, 92 (88); length of nasals, 30.6 (30); greatest breadth of both nasals together, 13.8 (13.4); diastema, 11 (7); zygomatic breadth, 42 (40); least interorbital breadth, 27 (26); mandible, 75 (70.6); maxillary toothrow (alveoli), 32 (31); maxillary premolars (crowns), 15.4 (16); mandibular toothrow (alveoli), 36.4 (36); mandibular premolars (crowns), 16 (16.4).

*Specimens examined.*—Three, the type from Mount Dulit, an adult male from Kinabatangan River and a female from the neighborhood of Sandakan.

*Remarks.*—The two specimens from British North Borneo have been so injured by the action of a preservative fluid that their color cannot be compared with that of the type. The color pattern is, however, the same. In general color the Bornean kanchil is not unlike *Tragulus rarus* of the Malay Peninsula, but the back is more heavily clouded relatively to the sides, and the nape stripe is of a very different character. In *Tragulus kanchil* the black clouding on both back and sides is noticeably in excess of the light element in the color, while in the Bornean animal this is true of the back only and even here to a distinctly less degree than in the Sumatran form.

### ***Tragulus natunæ*, sp. nov.**

1894. *Tragulus javanicus* Thomas and Hartert, Novitates Zoologicae, I, p. 660. September, 1894. Not *Cerous javanicus* Osbeck.

1895. *Tragulus javanicus* Thomas and Hartert, Novitates Zoologicae, II, p. 492. December, 1895. Part, included *T. pallidus*.

1901. *Tragulus javanicus* Miller, Proc. Washington Acad. Sci., III, p. 115. March 26, 1901.

*Type.*—Adult female (skin and skull), No. 104,614 United States National Museum. Collected on Bunguran Island, North Natunas, July 9, 1900, by Dr. W. L. Abbott. Original number, 555.

*Characters.*—In general similar to *Tragulus kanchil*, but smaller (hind foot of females 112-118 mm.) and more yellow.

*Color.*—The color pattern in all its details exactly resembles that of *Tragulus kanchil* but the ground color of upperparts is bright tawny-ochraceous instead of yellowish buff, and the black clouding is not in excess of the ground color. Nape band, broad and conspicuous, slightly

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\* Measurements in parenthesis are those of an adult male *Tragulus kanchil* from Tapanuli Bay, Sumatra (No. 114,426).



speckled by the yellowish annulations of some of the hairs, its lateral boundaries not very sharply defined. Crown dull brown, distinctly not as dark as in *T. kanchil*, and with most of the hairs noticeably annulated. Throat markings normal, the transverse dark bands united anteriorly. Both transverse bands and collar are ochraceous, but the former are distinctly clouded with a darker brown, much less so, however, than in *Tragulus kanchil*. Underparts with the usual yellowish markings; these not as dark as in *T. kanchil* and showing more of a tendency to spread laterally.

*Skull and teeth*.—The skull closely resembles that of *Tragulus virgicollis*, having a more elongate rostrum than in *T. kanchil*. This is particularly noticeable when the skulls are viewed from the side. The teeth do not, apparently, differ from those of the related species, but in the single male skull the premolars, both above and below, are remarkably heavy, and the first maxillary tooth is strongly imbricated over the second.

*Measurements*.—External measurements of type: total length, 523; head and body, 460; tail vertebrae, 63; hind foot, 118 (106); ear from meatus, 31; ear from crown, 26. Average of five adult females from the type locality: total length, 524 (520-532); head and body, 468 (460-482); tail vertebrae, 58 (50-70); hind foot, 116 (112-118); hind foot without hoofs, 103 (100-106). Skull of type: greatest length, 97; basal length, 92; zygomatic breadth, 43; diastema, 12.

*Weight*.—Type 1.8 kg. Average of five females from Bunguran Island, 2 (1.8-2.3).

*Specimens examined*.—Five skins and one extra skull, all from the type locality.

*Remarks*.—Although *Tragulus natunæ* approaches the Bornean *T. virgicollis* in its elongated rostrum and yellow color it is readily distinguishable by its small hind foot and broad, not sharply defined nape stripe. The bright color alone is enough to separate it from *Tragulus kanchil*. With *Tragulus pallidus* of Pulo Laut, North Natunas it needs no comparison.

### **Tragulus subrufus, sp. nov.**

1902. *Tragulus javanicus* Miller, Proc. Acad. Nat. Sci. Philadelphia, p. 143. June 11, 1902. Not *Cervus javanicus* Osbeck.

*Type*.—Adult female (skin and skull) No. 113,119 United States National Museum. Collected on Sinkep Island, South China Sea, September 5, 1901, by Dr. W. L. Abbott. Original number, 1285.

*Characters*.—Similar to *Tragulus kanchil* but color above slightly more yellow; and underparts much more extensively washed with fulvous.

*Color*.—The color above is more yellow than that of *Tragulus kanchil* but not as bright as in *T. natunæ*. Ground color orange buff, slightly paler on sides, and everywhere clouded with black, though less than in the Sumatran animal. Neck and outer surface of limbs tawny-

ochraceous a little grizzled by blackish hair tips. Upper surface of tail ochraceous-rufous washed with dark brown. Nape band broad and distinct but not sharply defined at sides, black with a few yellowish specks. Crown dark brown, faintly grizzled. Throat markings normal, slightly darker than in *Tragulus kanchil*. Underparts strongly washed with orange-buff along median line, this wash usually spreading toward sides and often separating white of chest from that of inguinal region. While there is some variation in this character the suffusion is always more extensive than in the Sumatran animal, so that when series are compared the difference is very noticeable.

*Skull and teeth*.—The skull and teeth do not differ from those of *Tragulus kanchil*.

*Measurements*.—External measurements of type: total length, 540; head and body, 470; tail vertebrae, 70; hind foot, 125 (113); ear from meatus, 32; ear from crown, 28. Measurements of an adult male from the type locality: total length, 528; head and body, 450; tail vertebrae, 78; hind foot, 120 (108.5). Skull of type: greatest length, 97; basal length, 90; zygomatic breadth, 42.6; diastema, 10.8.

*Weight*.—Type, 2.27 kg. Adult male from type locality, 1.8 kg.

*Specimens examined*.—Nineteen: five from Sinkep Island and fourteen (three in alcohol) from Linga Island.

*Remarks*.—In a certain degree this species is intermediate between the dull, dark, *Tragulus kanchil* of Sumatra, and the very bright *T. natunæ*. It is readily distinguishable from both of the related species.

### ***Tragulus rubeus*, sp. nov.**

*Type*.—Adult female (skin and skull) No. 115,522 United States National Museum. Collected on Pulo Bintang, Rhio Archipelago, August 20, 1902, by Dr. W. L. Abbott. Original number, 1914.

*Characters*.—Similar to *Tragulus subrufus* but with slightly larger skull and teeth and brighter colors.

*Color*.—Upperparts deep ochraceous-rufous, fading to tawny-ochraceous on sides and brightening to tawny on neck and outer surface of limbs. The back and sides are heavily clouded with black, about as in *Tragulus kanchil*. Underparts as in *T. subrufus* except that the fulvous is everywhere brighter and more red, very nearly approaching the ochraceous-rufous of Ridgway.

*Skull and teeth*.—The skull and teeth resemble those of *Tragulus subrufus* except that both average slightly larger.

*Measurements*.—External measurements of type: total length, 543; head and body, 478; tail vertebrae, 65; hind foot, 125 (113); ear from meatus, 36; ear from crown, 32. Two adult males from the type locality (Nos. 115,519 and 115,521) measure respectively: total length, 545 and 522; head and body, 465 and 457; tail vertebrae, 75 and 65; hind foot, 120 (108) and 118 (106). Skull of type: greatest length, 99; basal length, 91; zygomatic breadth, 41.

*Weight*.—Type, 2.4 kg. Adult male (No. 115,519) 1.8 kg.

*Specimens examined*.—Five, all from the type locality.

*Remarks*.—This species differs from all other known members of the *kanchil* group in its dark, rich color and broad but inconspicuous nape stripe. Its characters are in every way parallel with those of the *napu* of the same island.

### ***Tragulus ravulus*, sp. nov.**

1900. *Tragulus javanicus* Miller, Proc. Biol. Soc. Washington, XIII, p. 192. December 21, 1900. Part, specimens from Pulo Adang. Not *Cervus javanicus* Osbeck.

*Type*.—Adult female (skin and skull), No. 104,717, United States National Museum. Collected on Pulo Adang, Butang Islands, December 16, 1899, by Dr. W. L. Abbott. Original number, 161.

*Characters*.—Similar to *Tragulus rarus* of Trong, Lower Siam, but smaller, the neck paler, and the nape stripe more ill defined.

*Color*.—The color so closely resembles that of *Tragulus rarus*\* as to need no detailed description. The back and sides are light ochraceous-buff clouded with black, the two colors almost equally mixed, though the black is a little in excess on back. Throat markings and underparts as in *T. rarus*. Neck a lighter shade of ochraceous than in the mainland animal, and nape stripe ill contrasted with surrounding parts.

*Skull and teeth*.—The skull is not distinguishable from that of *Tragulus rarus*, but the teeth, particularly the upper premolars, appear to be more robust. The material at hand, however, is not extensive enough to prove that this character is constant.

*Measurements*.—External measurements of type: total length, 525; head and body, 450; tail vertebræ, 75; hind foot, 113 (103); ear from meatus, 32; ear from crown, 27. Measurements of an adult male from the type locality: total length, 518; head and body, 455; tail vertebræ, 63; hind foot, 112 (102). Skull of type: greatest length, 96; basal length, 89; zygomatic breadth, 41.8; diastema, 11.

*Weight*.—Type 1.8 kg. Adult male, 1.6 kg.

*Specimens examined*.—Two, both from Pulo Adang.

*Remarks*.—Although closely related to *Tragulus rarus* the *kanchil* of Pulo Adang appears to be sufficiently distinct to need recognition by name, though relative unfamiliarity with the group led me in 1900 to place it with the mainland form.

### ***Tragulus lancavensis*, sp. nov.**

1900. *Tragulus javanicus* Miller, Proc. Biol. Soc. Washington, XIII, p. 192. December 21, 1900. Part, specimens from Pulo Lankawi. Not *Cervus javanicus* Osbeck.

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\* See Proc. Biol. Soc. Washington, XV, p. 173. August 6, 1902.

*Type*.—Adult female (skin and skull), No. 104,412 United States National Museum. Collected on Pulo Lankawi, off west coast of Malay Peninsula (about 75 miles north of Penang), December 7, 1899, by Dr. W. L. Abbott. Original number, 132.

*Characters*.—Similar to *Tragulus rarus* but general color slightly more yellow and underparts extensively washed with orange-buff.

*Color*.—The color is very similar to that of *Tragulus rarus*, but the ochraceous-buff of the upperparts is noticeably brighter and more yellow, particularly that of back and sides. Chest and anterior half of belly strongly washed with dull orange-buff along median line, this suffusion tending to spread at sides so as to separate white of inguinal region from that of front part of chest. While this character is not wholly constant, it is sufficiently prevalent to impart a very different aspect to series of specimens of the two species.

*Skull and teeth*.—The skull and teeth do not differ appreciably from those of *Tragulus rarus*, though they probably average somewhat larger.

*Measurements*.—External measurements of type: total length, 520; head and body, 455; tail vertebrae, 65; hind foot, 117 (105); ear from meatus, 34; ear from crown, 29. Average of six adult females from the type locality: total length, 521 (505-545); head and body, 456 (435-480); tail vertebrae, 65 (65-65); hind foot, 118 (115-119); hind foot without hoofs, 105.5 (102-107). Skull of type: greatest length, 99; basal length, 94; zygomatic breadth, 42; diastema, 12.

*Specimens examined*.—Thirteen, all from Pulo Lankawi.

*Remarks*.—The more extensive material now at hand brings to light differences between this animal and the mainland from which passed unnoticed when I examined the island series in 1900. The yellowish suffusion on the underparts suggests that of the bright colored species from Sinkep, Linga, and the Rhio Archipelago, but is much less intense.

### ***Tragulus lampensis* sp. nov.**

*Type*.—Adult female (skin and skull) No. 104,429, United States National Museum. Collected on Pulo Lampe or Sullivans Island, Mergui Archipelago, February 4, 1900, by Dr. W. L. Abbott. Original number, 299.

*Characters*.—Similar to *Tragulus lankavensis*, but yellower throughout, particularly on underparts.

*Color*.—The color is in general like that of *Tragulus rarus* and *T. lankavensis*, but is more strongly yellow than in either. The wash on the underparts is of the same extent as in *T. lankavensis*, but is a bright orange-buff.

*Skull and teeth*.—I cannot see that the skull and teeth differ from those of the related species.



*Measurements.*—External measurements of type: total length, 515; head and body, 460; tail vertebrae, 55; hind foot, 118 (108); ear from meatus, 33; ear from crown, 27. Two other adult females (Nos. 104,430 and 104,431) measure respectively: total length, 500 and 540; head and body, 435 and 470; tail vertebrae, 65 and 70; hind foot, 113 (104) and 118 (108). Skull of type: greatest length, 97; basal length, 91; zygomatic breadth, 42; diastema, 10.

*Specimens examined.*—Three, all from Sullivans Island.